



Designation: C 1277 – 97

Standard Specification for Shielded Couplings Joining Hubless Cast Iron Soil Pipe and Fittings¹

This standard is issued under the fixed designation C 1277; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon (ε) indicates an editorial change since the last revision or reapproval.

1. Scope

1.1 This specification covers the evaluating of the performance of shielded hubless couplings to join hubless cast iron soil pipe and fittings.

1.2 The values stated in inch-pound units are to be regarded as the standard. The SI units given in parentheses are for information only.

1.3 The following precautionary caveat pertains only to the test method portion, Section 7, of this specification: *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.*

2. Referenced Documents

2.1 ASTM Standards:

A 48 Specification for Gray Iron Castings²

A 888 Specification for Hubless Cast Iron Soil Pipe and Fittings for Sanitary and Storm Drain, Waste, and Vent Piping Applications²

C 564 Specification for Rubber Gaskets for Cast Iron Soil Pipe and Fittings³

C 717 Terminology of Building Seals and Sealants³

2.2 CISPI Standard:

CISPI-301 Specification for Hubless Cast Iron Soil Pipe and Fittings for Sanitary and Storm Drain, Waste and Vent Piping Applications⁴

3. Terminology

3.1 Definitions:

3.1.1 Definition of the following term used in this specification is found in Terminology C 717, paragraph 4.1: elastomeric.

¹ This specification is under the jurisdiction of ASTM Committee C-24 on Building Seals and Sealants and is the direct responsibility of Subcommittee C24.75 on Gaskets and Couplings for Plumbing and Sewer Piping.

Current edition approved Dec. 10, 1997. Published June 1998. Originally published as C 1277-94. Last previous edition C 1277-94.

² Annual Book of ASTM Standards, Vol 01.02.

³ Annual Book of ASTM Standards, Vol 04.07.

⁴ Available from Cast Iron Soil Pipe Institute, 5959 Shallowford Rd., Suite 419, Chattanooga, TN 37421.

3.2 Definitions of Terms Specific to This Standard:

3.2.1 Descriptions of the following terms used in this specification are found in Terminology C 717, paragraph 4.2: durometer, dynamic.

3.2.2 The following descriptions of terms are applicable to this specification only:

3.2.2.1 *center stop*—an integral part of the gasket centered on the axial length of the gasket intended to limit the insertion depth of the pipe to be coupled.

3.2.2.2 *clamp assembly (n)*—that portion of the coupling excluding the gasket.

3.2.2.3 *coupling (n)*—the complete assembly.

3.2.2.4 *fitting (n)*—parts of a pipeline other than straight pipes, valves, or couplings.

3.2.2.5 *gasket (n)*—the elastomeric portion of the coupling.

3.2.2.6 *joint (n)*—the point of assembly consisting of the coupling and the joined pipes or fittings, or both.

3.2.2.7 *shield (n)*—an external metallic protective device designed to protect the sealing gasket from external elements that could cause failure of the sealing assembly.

4. Materials and Manufacture

4.1 Physical properties of gaskets shall comply with Specification C 564 using the applicable Durometer hardness requirement of the column of Table 1 of that document as specified by the manufacturer.

4.2 All cast iron parts shall be made of a minimum class 25 gray cast iron and shall show compliance to this requirement using test methods contained in Specification A 48.

4.2.1 Clamp assembly screws or bolts shall not have screw-driver slots.

5. Elastomeric Gasket Requirements

5.1 The elastomeric gasket shall consist of one piece conforming to the physical requirements.

5.1.1 The elastomeric gasket shall have an inside center stop that does not create an enlargement chamber or recess with a ledge, shoulder, or reduction of pipe area or offer an obstruction to flow.

5.1.2 The elastomeric gasket shall be free of defects that affect the use and serviceability.

TABLE 1 Dimensions and Tolerances for Hubless Pipe and Fittings

Size, in. (mm)	Outside Diameter, in. (mm)
1½ (38)	1.90 ± 0.06 (48.26 ± 1.52)
2 (51)	2.35 ± 0.09 (59.69 ± 2.29)
3 (76.2)	3.35 ± 0.09 (85.09 ± 2.29)
4 (102)	4.38 + 0.09/-0.05 (111.25 + 2.29/-1.27)
5 (127)	5.30 + 0.09/-0.05 (134.62 + 2.29/-1.27)
6 (152)	6.30 + 0.09/-0.05 (160.02 + 2.29/-1.27)
8 (203)	8.38 + 0.13/-0.09 (212.85 + 3.30/-2.29)
10 (254)	10.56 ± 0.09 (268.22 ± 2.29)

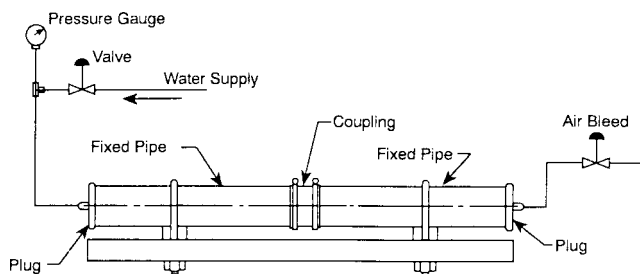


FIG. 1 Restrained Hydrostatic Joint Test

6. Clamp Assembly Requirements

6.1 The clamp assembly shall be made of material conforming to the requirements as outlined in Section 6.

6.1.1 All steel parts shall be of 300 series stainless steel. All steel parts made from round stock shall be of 300 series stainless steel (excluding copper bearing alloys).

6.1.2 Clamp assemblies shall be tested to withstand no less than the manufacturers stated installation torque or a minimum of 60 lbf-in. (6.78 N·m) of applied torque, whichever is greater, without visible signs of failure. The clamp assembly shall be tested over a steel mandrel of the appropriate diameter and torqued as required.

7. Couplings Requirements and Test Methods

7.1 Assemble each coupling tested according to the manufacturer's instructions between two sections of randomly selected hubless cast iron soil pipe meeting the requirements of CISPI 301 or Specification A 888 and conduct the following test: hydrostatic, deflection, and shear.

7.1.1 Restrained Hydrostatic Joint Test:

7.1.1.1 Support the pipe assemblies in a manner that restrains joint movement as shown in Fig. 1.

7.1.1.2 Fill the assemblies with water, expel all air and apply a hydrostatic pressure in increments of 1 psi (6.9 kPa) at approximately 30 s intervals until a pressure of 13 psi (89.6 kPa) is reached and maintain 30 min. Any leakage shall mean failure.

7.1.2 Deflection Test:

7.1.2.1 A test apparatus such as the one shown in Fig. 2 is suggested. Other testing apparatus that provide restraint to the assembly shall also be permitted. Close the outboard ends of the pipe with test plugs.

7.1.2.2 Fill the assembly with water, expel all air, and hydrostatically pressurize to 4.3 psi (29.6 kPa) for the duration of the test. One pipe shall be rigidly supported and while the assembly is under pressure, raise the opposite end of the other pipe ½ in. (12.7 mm) per lineal foot of pipe. Maintain the pressure for 5 min. Any leakage shall mean failure.

7.1.3 Shear Test:

7.1.3.1 Support two joined lengths of randomly selected hubless cast iron soil pipe on blocks, a minimum of 1½ in. (38.1 mm) high, at three locations. One length shall be a minimum of 24 in. (609.6 mm) in length, supported on blocks, one near the uncoupled end, and the other immediately adjacent to the couplings. Firmly restrain this length in position as shown in Fig. 3. The other coupled length shall be a minimum of 5 ft (1.52 m) in length and supported by a single block 6 in. (152.4 mm) from the end of the pipe.

7.1.3.2 Fill the assembly with water and expel all air. Apply a load of 50 lb/in. of nominal diameter at a point 6 in. (152.4 mm) from the edge of the coupling upon a 12 in. (304.8 mm) length of (3 by 3) angle iron or load distribution pad located on the top of the pipe immediately adjacent to the coupling of the pipe having one support only. Under this loading there shall be no visible leakage or displacement of more than ⅜ in. (9.53 mm) from true alignment adjacent to the coupling, when an internal pressure equivalent to a 10 ft (3.05 m) head of water (4.3 psi (29.6 kPa)) is applied. Maintain the load and internal pressure for 15 min.

7.2 Thrust Test:

7.2.1 Assemble each coupling tested according to the manufacturer's instruction between two sections of machined steel pipe and conduct the thrust test.

7.2.2 The assembly shall consist of a maximum outside diameter pipe connected to a minimum outside diameter pipe with diameters as referenced in Table 1 and lengths as shown

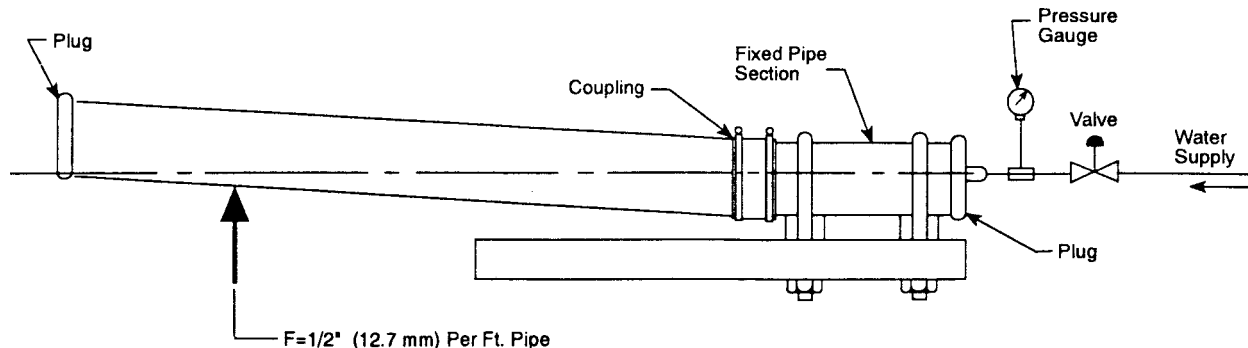


FIG. 2 Deflection Test

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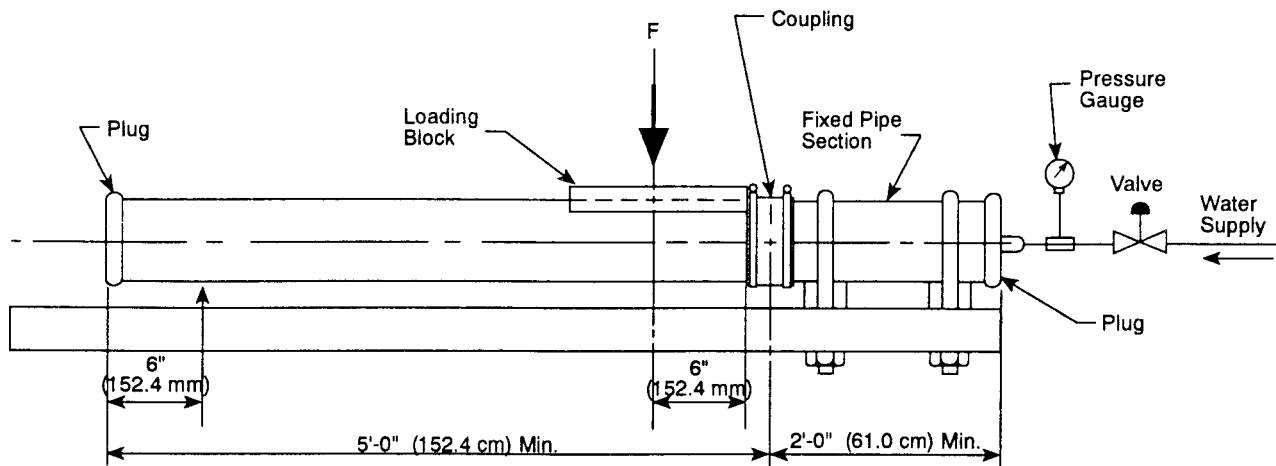


FIG. 3 Shear Test

in Fig. 4. Machine the plain ends of the pipe to be used for the thrust test to the correct diameters. Plain ends shall have 0.015 in. (0.38 mm) deep grooves machined circumferentially around them at 1/8 in. (3.18 mm) intervals down the pipe section for a distance equal to that covered by the elastomeric sleeve of the coupling being tested. The tool used to machine the grooves

shall have a 60° inclined angle and cut into the pipe from a perpendicular position. The surface between the grooves shall be a lathe turned surface of 125 RMS.

7.2.3 The plain ends of the pipe for the thrust test shall be uncoated and cleaned with acetone and thoroughly dried before each assembly.

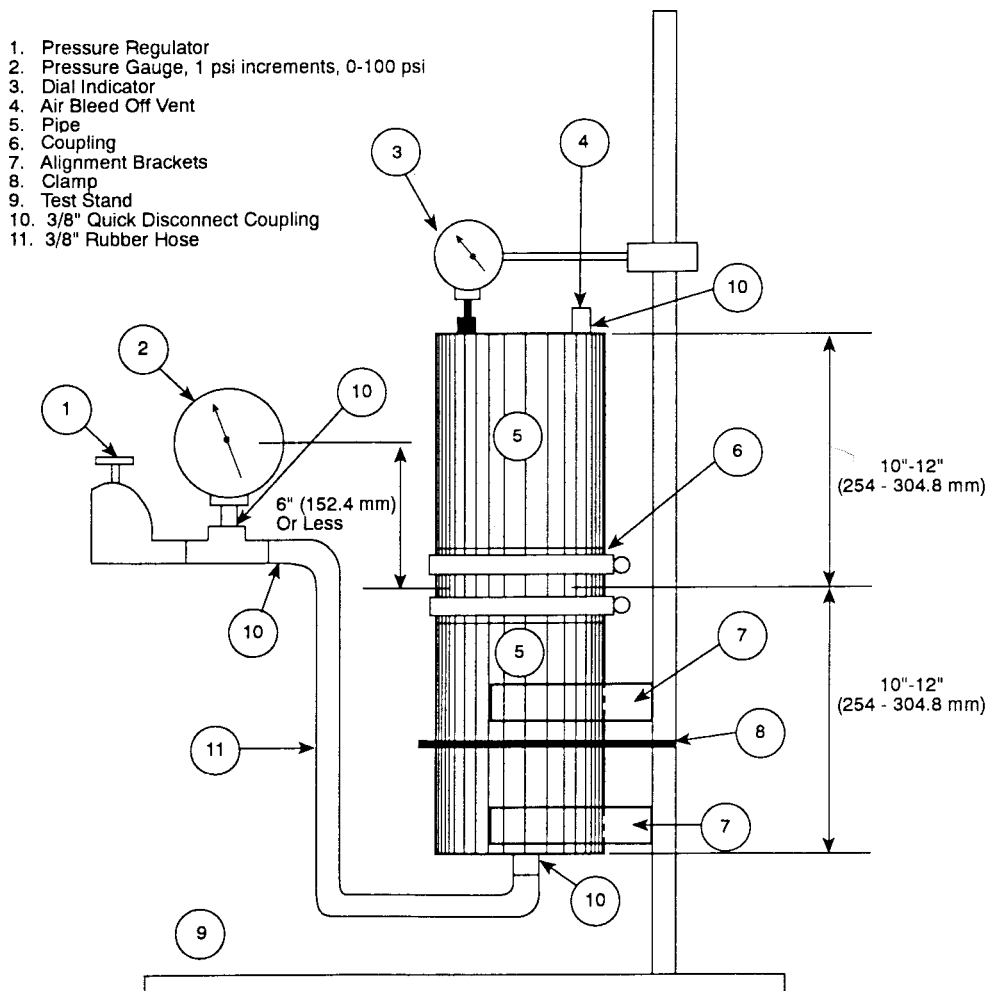


FIG. 4 Thrust Test



7.2.4 Test Method:

7.2.4.1 Support the pipe assemblies in a manner that does not restrain joint movement as shown in Fig. 4.

7.2.4.2 Fill the pipe assembly (as required in 7.2) with water, expelling all air. Increase the hydrostatic pressure at a rate of 1 psi (6.9 kPa) every 30 s until the specified test pressure is reached. The specified test pressure shall be 20 psi (137.9 kPa) for 1½ in. (38.1 mm) through 5 in. (127 mm), 18 psi (124.1 kPa) for 6 in. (152.4 mm), 10 psi (68.9 kPa) for 8 in. (203.2 mm), and 6 psi (41.4 kPa) for 10 in. (254 mm) pipe.

When the specified test pressure is reached, hold it for 10 min. Any leakage or axial joint movement of more than 0.150 in. (3.81 mm) shall mean failure.

8. Markings and Identification

8.1 Permanently mark each clamp assembly and gasket with the manufacturer's name or trademark, country of origin, and the pipe size for which it is designed.

8.2 The product shall also have any other markings required by law and may include this designation (ASTM C 1277).

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